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**Annotated Bibliography:**

Bellamy, R., & Woolsey, K. (1997). Science Education and Technology: Opportunities to Enhance Student

Learning. *The Elementary School Journal, 97*, 385-389. Retrieved October 8, 2009 from Education Full

Text.

This article emphasizes the importance of using technology in science learning. It gives a list of technology capabilities such as; calculation, simulation, data collection, imaging, writing, information access, networking, presentation, portability etc, describing each of them. It gives also a full view of examples of technology and pedagogy combined.

ChanLin, L. (2008). Technology Integration applied to project- based learning in science. *Innovations in*

*Education and Teaching International, 45*(1), 55-65. Retrieved October 6, 2009 from

<http://vnweb.nwwilsonweb.com>

This study reveals the results of a study that observed the use of technology during project based learning activities in science. Students used the computer technology for collecting information and organizing it. The study showed that all students achieved their researched goal, concluding that technology helps students learn better in science.

Ching, C. C., & Kafai, Y. B. (2001). Affordances of Collaborative Software Design Planning for Elementary

Students’ Science Talk. *The Journal of the Learning Science, 10*(3), 323-363. Retrieved on October

20, 2009 from <http://web.ebscohost.com>

This paper discusses the concerns that some students might lose sight of science learning while integrating technology. In order to investigate if collaborative software gives rise to science talk, a classroom of 33 students is divided in 7 teams. Their discussions, as they planned for creating instructional software designs, were investigated. The study found that science talk was encouraged in the planning sessions; however, the quality of that talk, how it arose, and how it was situated were open questions.

Dalacosta, K., Paparrigopoulou, M. K., Palyvos, J. A., & Spyrellis, N. (2009). Multimedia application with

Animated cartoons for teaching science in elementary education. *Computers & Education, 52*(4), 741-

748. Retrieved October 25, 2009 from <http://www,sciencedirect.com/>

This article discusses the research findings on the effects of using animated cartoons in a multimedia application to support learning in science. The study is done in different elementary schools of Athens, Greec, on 10-11 years old students. The study found that the use of animated cartoons increases the understanding of science concepts of young students.

Dani, D., & Koeing, K. (2008). Technology and Reform –Based Science Education. *Theory into Practice,*

*45, 204-211. Retrieved on October 6, 2009 from http://www.jastor.org*

This article emphasizes the importance of integration of digital technologies into science teaching, concluding that students learn best through technologies. It provides practical examples that show how high quality technology improves science lessons.

Fie, T. M., Khang,G. N., & Sai, CH. L. (2005). Multimedia Learning Design Pedagogy: A Hybrid Learning

Model. *US-China Education Reviwew, 2*(9), 59-62. Retrieved on November 16, 2009 from

Education Full Text.

This article reports on an investigation of a hybrid learning model for multimedia learning based on Piaget’s science learning cycle model and the Kolb’s experiental learning model. The Piagetian learning cycle model is a student-centered and inquiry-based learning cycle that represents an inductive application of information processing models of teaching and learning.

Gardner, H. (2000). *Can Technology Exploit Our Many Ways of Knowing?* Retrieved on October 14, 2009,

from http://www.howardgardner.com/docs/

According to Gardner’s Multiple Intelligences Theory, intelligences are defined as musical, bodily-kinesthetic, logical-mathematical, spatial, linguistic, intrapersonal, and interpersonal.

Gardner, H., & Walters, J. (1993). A Rounded Version. In F. Schultz, *Notable Selections in*

*Education* (pp. 308-318). Connecticut: McGraw-Hill/Dushkin.

In this article, Gardner and Walter discuss the multiple forms of intelligent human behavior. They identify seven intelligences that fit their definition. They are musical, bodily-kinesthetic, logical-mathematical, linguistic, spatial, interpersonal, and intrapersonal intelligences.

Gillen, J., Littleton, K., Twiner, A., Staarmant, K. J., & Mecer, N. (2007). Using the interactive whiteboard

to resource continuity and support multimodal teaching in a primary science classroom. *Journal of*

*Computer Assisted Learning, 24,* 348-358. Retrieved on October 17, 2009 from

<http://web.ebscohost.com>

This article discusses the range of potential benefits the interactive whiteboard offers to the primary science classroom. The study investigates how the interactive whiteboard resources continuity in students’ learning experiences. It also offers new opportunities for fostering multifaceted pedagogic strategies.

Hannassy, S., Deaney, R., Ruthven, K., & Winterbottom, M. (2007). Pedagogical Strategies for using the

Interactive whiteboard to foster learner participation in school science. *Learning, Media and*

*Technology, 32*(3), 283-301. Retrieved on October 28, 2009 from <http://web.ebscohost.com>

This study investigates how experienced teachers are trying to use smart board to enhance learning in science. The study concludes that the strengths of interactive white boards consists in sharing cognition, especially articulation, collective evaluation, and reworking on students’ own ideas.

Hannessy, S., Wishart, J., Whitelock, D., Deaney, R., Brawn, R., Velle, L., …McFarlane, A. (2005).

*Pedagogical Approaches for Technology –Integrated Science Teaching*. Retrieved October 9, 2009

from <http://web.ebscohost.com>

This paper discusses how pedagogical approaches associated with these technological tools are adopted to cognitive and structuring resources available in the classroom settings. Four teachers used simulations, data logging etc, to support prediction and to demonstrate scientific concepts. They also used technology to support knowledge building, consolidation, and application. Teachers found that offering students some control over their own learning can provide challenge, motivation, and engagement for most of the students.

House, J. D. (2009). The Effects of Instructional and Computer Activities on Interest in Science Learning

for Students in the United States and Korea: Results from the TIMSS 2003 Assessment. *Int J Instr*

*Media, 36*(1), 119-131. Retrieved on November 13, 2009 from <http://bst.pubsage.com>

This article presents a study that investigated the relationship between computer activities and classroom instructional strategies as well as students’ motivation for learning science. Students included in this study were from the TIMSS 2003, from United States and Korea. The study found that computer activities and instructional strategies did positively changed students’ attitude towards science.

Hubbell, E. R., & Kuhn, M. (2007). Using Technology to Promote Inquiry. Principal November/December  
 2007. Retrieved on October 29, 2009 from Education Research Complete.  
  
This article discuses the importance of using technology in order to promote inquiry in science classrooms. Simulations, movies, and other activities that technology offers, capture students' attentions and engage them in the lesson by asking questions first, and then by trying to discover through the course of their inquiry.

Hug, B., Krajcik,J. S., Marx, & R. W. (2005). Using Innovative Learning Technologies to Promote  
 Learningand Engagement in an Urban Science Classroom.Urban Education, 40, 446-472. Retrieved   
 on October 16, 2009 from web site [http://uex.sagepub.com](http://uex.sagepub.com/)  
  
This article reports on a study done in an urban public school which investigated how two interactive learning technologies embedded within an extended project-based science curriculum unit are capable of engaging urban students in actively learning key science concepts. The article indicates that students were engaged in science content through the use of two interactive learning technologies.

Kim, M. C., Hannafin, M. J., & Bryan, L. A. (2007). Technology-Enhanced Inquiry Tools in Science  
 Education: An Emerging Pedagogical Framework for Classroom Practice. Science Education, 91,   
 1010-1030. Retrieved on October 27, 2009 from Education Research Complete.  
  
This study discusses the opportunities associated with technology-supported inquiry classrooms in terms of student learning, teachers’ practices, and classroom environment. The study finds that it is not the innovative technologies per se that have an impact on students' learning, but the interactive and iterative learning environments.

Kim, P. (2006). Effects of 3D Virtual Reality of Plate Tectonics on Fifth Grade Students’ Achievement

and Attitude Toward Science*. Interactive Learning Environments, 14,* 25-34. Retrieved October 14,

2009 from <http://web.ebscohost.com>

This study focuses on advantages that high powered computers have made in teaching science. It examines the effects of 3D virtual reality simulations on fifth grade students’ tests and attitudes toward science, compared to traditional 2D instructional material with the same topics. The study revealed that 2D group scored higher on the achievement test than the group using traditional 2D materials.

Kim, P., & Olaciregui, C. (2007). The effects of a concept map-based information display in an electronic

Portfolio system on information processing and retention in a fifth-grade science class covering the

Earth’s atmosphere. *British Journal of Educational Technology, 39*(4), 700-714. Retrieved on

November 15, 2009 from Education Research Complete.

This study investigates the effect of a concept mapping as a method to enhance visualizations and its effects as a basis for the design of a web-integrated electronic portfolio system. The study found that the concept map-based interface may be superior to a conventional presentation method in helping students in searching and retaining information.

Kumar, D. D., & Altschuld, J. W. (2000). Science, Technology, and Society: Policy Implications.

*Bulletin of Science Technology Society, 20*(2), 133-138. Retrieved on November 12, 2009 from

<http://bst.sagepub.com>

This paper reports a reanalysis of selected national and state level Science, Technology and Society implementation data. The results show that three major issues that affect STS implementation in US are: teacher education, suitable curriculum materials, and insufficient class time.

Li, S. C., Law, N., & Lui, K. F. A. (2006). Cognitive perturbation through dynamic modeling: a pedagogical

approach to conceptual change in science. *Journal of Computer Assisted Learning, 22,* 405-422.

Retrieved on November 16, 2009 from http://web.webscohost.com

This study investigates the progress of students’ conceptual change using computer supported modeling environment for the observed phenomenon of evaporation. The study found that dynamic modeling using the environment World Maker 2000 combined with the use of a cognitive perturbation strategy by the teacher was effective in helping students change their conceptions towards more scientifically ones during the entire process.

Lin, Y., Sun, K., & Yu, Ch. (2007). A study on learning effect among different learning styles in a Web-

based lab of science for elementary school students. *Computers and Education, 50*(4), 1411-1422.

Retrieved on October 15, 2009 from <http://www.sciencedirect.com>

This study investigates learning effect in terms of different learning styles in a web-based virtual science laboratory for elementary school students. The study reveals that students that used the online virtual lab achieved better grades than those in the control group under traditional class instruction. The study found also that web-based virtual learning environment is suitable for various learning styles.

Mouza, Ch., & Bell, B. B. (2001). Assessing the Impact of a Web-Driven, Goal-Based Scenario in the  
 Science Classroom. The Journal of Computers in Mathematics and Science Teaching, 20(3), 265-292.  
 Retrieved on November 2, 2009 from Education Research Complete.  
  
This article presents a study designed to assess the impact of technology integration on teachers and students. A web-based science project (ALPINE) aimed at teaching students weather concepts, data gathering, processing techniques, and problem solving was employed. Numerical data showed that the web had no significant statistical impact on either the teachers or the students but observational and interview data demonstrated that instructional technology, when successfully implemented, could have significant effect on students.

Papanastasiou, E. C. (2003). Science Literacy by Technology by Country: USA, Finland and Mexico:

Making sense of it all. *Research in Science and Technological Education, 21*(2), 230-241. Retrieved

from <http://web.ebscohost.com>

This study examines the effects of computer software on higher or lower levels of science literacy in the USA, Finland, and Mexico. The study showed that it was not computer use itself that effected the science achievement of the students but the way in which computers were used in each country.

Qian,Y. (2009). 3D Multi-User Virtual Environments: Promissing Directions for Science Education.

Trindale, J., Fiolhais, C., & Almeida, L. (2002). Science learning in virtual environments: a descriptive

Study. British Journal of Educational Technology, 33(4), 471-488. Retrieved on November 16, 2009

from <http://bst.sagepub.com>

This study focuses on a virtual environment (Virtual Water) for studying states of matter. The study found that Computer-based worlds are useful to visualize physical and chemical processes and help students to gain a better understanding of the concept, especially students with high spatial aptitude. The concepts which have been better understood were those connected with phases and phase transitions. Those had more interactivity.

William, M. (2008). Moving Technology to the Center of Instruction: How One Experienced Teacher

Incorporates a Web-based Environment over Time. *Journal of Science Education & Technology, 17,*

316-333. Retrieved on November 2, 2009 from Education Research Complete.

This article reports on a 3 year study of an experienced fifth grade teacher learning to integrate a Web-based Inquiry Science Environment (WISE) into his core science instruction. The study indicates that the teacher's classroom practices shifted meaningfully over time, thus moving WISE from the peripheral to the center of his science class instruction. The study shows that repeated practice with the same curriculum can improve individual teachers’ performance, gaining competence in integrating technology into their science teaching.

Zucker, A. A., Tinker, R., Staudt, C., Mansfield, A., & Metcalf, Sh. (2008). Learning Science in grades 3-8

Using Probeware and Computers: Findings from the TEEMSS II Project. *Journal in Science Educational*

*Technology, 17,* 42-48. Retrieved October 16, 2009 from <http://web.ebscohost.com>

This study reports on the effect of technologies in teaching science. The Technology Enhanced Elementary and Middle School Science project (TEEMSS), prepared 15 science inquiry based instructional science units for teaching in grades 3-8. Computer and probeware are used for teaching each unit. The study shows that there were significant differences in science learning in four units, favoring the students who used the TEEMSS materials. In the other four units there were no differences